

OCR Computer Science A Level

2.2.2 Computational Methods

Flashcards



What is meant by a computable problem?



What is meant by a computable problem?

A problem that can be solved using an algorithm



Give three limiting factors to computable problems



Give three limiting factors to computable problems

Three from:

- Processing power
- Processor speed
- Computer memory
- Time



State two factors which may be considered during the Problem Definition phase



State two factors which may be considered during the Problem Definition phase

- Strengths and weaknesses of current solution
- Volume/type/frequency/nature of
 - Inputs
 - Outputs
 - Stored data



What is the name given to the process in which problems are continually broken down until each subproblem can be represented as a subroutine?



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Problem decomposition



State two purposes of problem decomposition



State two purposes of problem decomposition.

Two from:

- Identify sections which can make use of pre-coded modules or libraries
- Save timecoding
- Simplify project management
- Simplify testing and maintenance
- Faster project delivery
- Develop sections in parallel



Describe how the Divide and Conquer technique works



Describe how the Divide and Conquer technique works

The problem size is halved with every iteration. Each individual subproblem is then solved recursively. The solutions to the subproblems are then recombined to form the final solution to the problem.



Give two applications of divide and conquer



Give two applications of divide and conquer

Two from:

- Merge sort
- Binary search
- Quick sort



Which programming construct do many problems solved using Divide and Conquer use?



Which programming construct do many problems solved using Divide and Conquer use?

Recursion



What is representational abstraction?



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What is representational abstraction?

A computational technique in which excessive details are removed to simplify a problem



What type of abstraction is used to group together sections of the problem based on their functionality?



What type of abstraction is used to group together sections of the problem based on their functionality?

Abstraction by generalisation



State two problem solving techniques



State two problem solving techniques.

Two from:

- Backtracking
- Data mining
- Abstraction
- Divide and conquer
- Visualisation
- Performance modelling
- Pipelining
- Visualisation



Describe how backtracking works



Describe how backtracking works

The backtracking algorithm works by methodically visiting each path and building a solution based on the paths found to be correct. If a path is found to be invalid at any point, it backtracks to the previous stage and visits an alternate path.



When might heuristics be used in problem-solving?



When might heuristics be used in problem-solving?

When the standard way to solve the problem is unreasonably time-consuming or resource-intensive



State two advantages of using performance modelling



State two advantages of using performance modelling

Two from:

- Safe
- Relatively inexpensive
- Less time-consuming



What is pipelining?



What is pipelining?

A process in which tasks are developed in parallel. The output of one process in pipelining becomes the input of another, resembling a production line.



What is the name given to the technique used to identify patterns and trends in large sets of data?



What is the name given to the technique used to identify patterns and trends in large sets of data?

Data mining

